

PATENT ABSTRACTS OF JAPAN

(11) Publication number : 09-149761

(43) Date of publication of application : 10.06.1997

(51) Int.Cl.

A23B 4/08
A23B 4/02
A23B 4/044
// A23L 1/318

(21) Application number : 07-333895

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(22) Date of filing :

29.11.1995

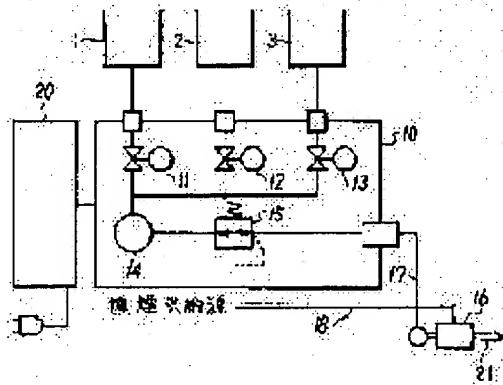
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(54) TREATMENT FOR RETAINING FRESHNESS AND COLOR OF FRESH MEAT AND DEVICE THEREFOR

(57) Abstract:

PROBLEM TO BE SOLVED: To provide a means for retaining the freshness and color of a fresh meat so that the freshness, color and taste of the fresh meat can be retained for a long period as a food to be eaten in the raw state without requiring the dissection of a body, even when a large body fish such as a tuna is retained.

SOLUTION: This method for retaining the freshness and color of a fresh meat comprises injecting a perfusate for retaining the freshness and the color into the arteries of a fish or predatory animal instead of blood in the arteries with a circulation pump 14. Therein, a solution prepared by charging a smoke as fine bubbles into a freshness-retaining agent aqueous solution received in perfusate tanks 1-3 with a smoke-mixing device 16 is used as the perfusate. The perfusate is injected into the arteries of the target to be treated, and subsequently refrigerated and retained to impregnate the injected ingredients into the meat.



LEGAL STATUS

[Date of request for examination] 22.11.2002

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number] 3522936

[Date of registration] 20.02.2004

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the block diagram showing the equipment which enforces the freshness and the color tone maintenance art of the fresh meat concerning this invention.

[Drawing 2] It is the important section side elevation showing the structure of the filling pipe used in the above-mentioned equipment.

[Drawing 3] It is the important section side elevation showing the condition of pouring in ring current liquid from the heart of a tuna using the above-mentioned filling pipe.

[Drawing 4] It is the block diagram showing other examples of a configuration of the freshness and the color tone maintenance processor concerning this invention.

[Drawing 5] It is the sectional view showing the example of a configuration of the smoking mixing equipment in the above-mentioned freshness and color tone maintenance processor.

[Drawing 6] It is the perspective view of the concavo-convex board of the major diameter in this smoking mixing equipment.

[Drawing 7] It is the perspective view of the concavo-convex board of the minor diameter in this smoking mixing equipment.

[Drawing 8] It is a sectional view for explaining the free passage condition of each areole at the time of carrying out the polymerization of the concavo-convex large and small board.

[Drawing 9] It is the sectional view showing the example of a configuration of other smoking mixing equipments in the freshness and the color tone maintenance processor concerning this invention.

[Drawing 10] It is a sectional view in the A-A location in drawing 9.

[Drawing 11] It is the sectional view showing the example of a configuration of other smoking mixing equipments in the freshness and the color tone maintenance processor concerning this invention.

[Drawing 12] It is the decomposition perspective view of the set element in smoking mixing equipment same as the above.

[Drawing 13] It is the sectional view showing the example of a configuration of other smoking mixing equipments in the freshness and the color tone maintenance processor concerning this invention.

[Drawing 14] It is the perspective view of the concavo-convex board of the major diameter in smoking mixing equipment same as the above.

[Drawing 15] It is the expanded sectional view of the concavo-convex board of the major diameter in the smoking mixing equipment of drawing 13.

[Drawing 16] It is the expanded sectional view of the concavo-convex board of the minor diameter in the smoking mixing equipment of drawing 13.

[Drawing 17] It is the decomposition perspective view of the mixed element in smoking mixing equipment same as the above.

[Drawing 18] It is the partial expanded sectional view showing the wearing condition of the seal member to the seal groove in the above-mentioned mixed element.

[Drawing 19] It is the side elevation showing other examples of a configuration of the concavo-convex board of a minor diameter used in the smoking mixing equipment of drawing 13.

[Description of Notations]

1-4 Ring current liquid tank
14 46 Ring current pump
16, 50, 80,100 Smoking mixing equipment
21 47 Delivery valve
22 Filling Pipe
33 Main Artery
43 Circulating Flow Way
51 81,101 Casing
53, 55, 83, 85,103,105 Lid
54 84 Inlet port
56 86 Outlet
57 87,107 Mixed element
58, 59, 70, 71, 88, 89,108,109,131 The concavo-convex board
60, 61, 72, 73, 90, 91,110,111 Smallness standing wall
62, 63, 74, 75, 92, 93, areole 112,113 Areole
64 Circulation Hole
65 Circulation Way
96a Cylinder part
96b a collar -- a piece
96 Fit-in Seal Object
98 Set Element
122,103b, 105b, 133 Seal bearing surface
125 Seal Member

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]**[0001]**

[Field of the Invention] without this invention disassembles what has high freshness (or it is alive, thing soon after a postmortem) with a large-sized fish like the tuna which has a fish or a meat beast, especially lean meat -- eating raw food of every round head, sushi, sliced raw fish, etc. -- it is related with the freshness and the color tone maintenance art of the fresh meat for making the freshness hold in a circulation phase until it results in a consumer as a **, and its equipment.

[0002]

[Description of the Prior Art] Fish, such as uncooked meat of a fish or livestock, especially a tuna, oxidize in time amount with an early very short oxidation rate, the flesh color of a scarlet color turns into brown or dark brown, and quality deteriorates. For this reason, in current, frozen preservation which keeps the temperature of goods of the fish captured at sea at ultra low temperature -60 degrees C or less, and the so-called refrigeration preservation which cools the temperature of goods to temperature higher than a freezing point are performed. However, although discoloration can be prevented or the former refrigeration preservation can prevent the fall of freshness over a long period of time (month unit), while even a consumer's hand conveys the fish fished in the ocean or the foreign country for ultra low temperature, it needs very big cost. On the other hand, the latter freshness and the latter color tone retention period by refrigeration are short, it is in the condition of refrigeration extent of not requiring cost compared with refrigeration for this reason, and protraction of the freshness and the color tone maintenance period when freshness, a color tone, mouthfeel, and the taste are not spoiled is desired.

[0003] Coping with such a problem, one person of this invention person has proposed the smoking art for making the freshness hold over a long period of time by making fish meat, such as a tuna, raw edible previously. what the approach cools it at 1-5 degrees C mainly using preservation from decay, sterilization, and smoking containing the high component of the discoloration prevention effectiveness, and is contacted to a non-processing object -- it is -- the usual smoking by this -- differing -- eating raw food -- freshness under transportation for circulation and maintenance of quality are enabled in the refrigeration or the frozen temperature which can be acquired easily, without spoiling the taste as a **. However, if the time amount according to the thickness of fish meat is needed and this smoking processing time becomes long in order to make the above-mentioned smoking permeate fish meat, deterioration of quality will also advance to coincidence between that processing, therefore speeding up of smoking processing is desired.

[0004]

[Problem(s) to be Solved by the Invention] Even if the technical technical problem of this invention fills request of wanting to process a fish and a meat beast which were mentioned above simply and quickly , so that maintenance of mouthfeel and the taste may be aimed at in freshness and a color tone maintenance list and is the big fish of a fish etc. like a tuna In a circulation phase until it results in a consumer after enabling it to process so that freshness, a color tone, a taste, etc. as raw edible, such as every round head, sushi, and sliced raw fish, may be held and capturing by it, without disassembling it It

is in advance of oxidation being controlled also in the refrigeration obtained easily, and offering the freshness and the color tone maintenance art of the fresh meat which enabled it to hold the freshness, a color tone, mouthfeel, the taste, etc. in the raw condition substantially, and its equipment.

[0005] The still more concrete technical problem of this invention by pouring in into a fish smoking and the freshner which are valid or have preservation from decay, sterilization, and the discoloration prevention effectiveness using blood vessels, such as a fish soon after a postmortem Making those components permeate the whole fish for a short time, and holding a raw condition It is in it not only enabling maintenance of quality, such as freshness under transportation for circulation, and a color tone, but offering the freshness and the color tone maintenance art of the fresh meat which enabled it to also improve mouthfeel and a taste, and its equipment. The technical technical problem of further others of this invention is faced dissolving the above-mentioned smoking in the water solution of a freshner, and is to offer the easy means which made it possible to make smoking mix as a detailed cellular particle very efficiently.

[0006]

[Means for Solving the Problem] The freshness and the color tone maintenance art of the fresh meat of this invention for solving the above-mentioned technical problem It faces pouring in the ring current liquid for replacing with the blood in a blood vessel through the artery of the processing object which is a fish or a meat beast, and aiming at freshness and color tone maintenance. As the above-mentioned ring current liquid After pouring it in into the blood vessel of a processing object using the thing which made smoking mix in the water solution of a freshner as minute air bubbles, it is characterized by making the impregnation component permeate meat by refrigeration storage.

[0007] In the freshness and the color tone maintenance art of the above-mentioned fresh meat, the thing which made smoking mix in the water solution which can add a sodium chloride to ring current liquid, or contains a sodium citrate, a freshner, and a sodium chloride as ring current liquid as minute air bubbles can be used, and the single liquid which made smoking mix in the water solution containing a sodium citrate, a freshner, and a sodium chloride as minute air bubbles can also be used further. Moreover, it faces pouring in the ring current liquid for replacing with the blood in a blood vessel through the artery of a processing object, and aiming at freshness and color tone maintenance. Transpose blood to a sodium-citrate water solution first, next the sodium-citrate water solution is transposed to the water solution of a freshner. Furthermore, while adding a sodium chloride for the water solution of the freshner to the water solution of a freshner, after transposing to the ring current liquid in which smoking was made to mix as minute air bubbles and pouring it in into the blood vessel of an object, the impregnation component can be made to permeate meat by refrigeration storage.

[0008] The concavo-convex board of two sheets which protruded the small standing wall on the opposed face which counters mutually on the occasion of the water solution of a freshner for making it mix smoking as detailed air bubbles in the above-mentioned approach, and formed much areole by the small standing wall is made into a lot. In the mixed element which two or more areole of the concavo-convex board of another side were mutually made open for free passage, and carried out the polymerization of each areole of the opposed face in those concavo-convex boards Vapor-liquid 2 component of the water solution of the above-mentioned freshner and smoking can be circulated through the multiplex reversal interflow way formed of the free passage of these areole, and, thereby, the water solution of the above-mentioned freshner can be made to distribute smoking as a detailed particle.

[0009] On the other hand, the freshness and the color tone maintenance processor of the fresh meat of this invention The ring current liquid tank which holds the freshner as ring current liquid, and the circulating flow way which infixes the circulating pump made to circulate through the ring current liquid in a ring current liquid tank, The smoking mixing equipment which mixes smoking with the ring current liquid infixes all over this circulating flow way, and the smoking source of supply which supplies smoking to smoking mixing equipment, It consists of the delivery valve which pours in the ring current liquid in a ring current liquid tank into a blood vessel through the artery of the processing object which is a fish or a meat beast. Said smoking mixing equipment In casing which has the inlet port and outlet which are connected to a circulating flow way, the mixed element of the number of arbitration is

held and it changes. This mixed element The concavo-convex board of two sheets which protruded the small standing wall on the opposed face which counters mutually, and formed much areole by the small standing wall is made into a lot. Make two or more areole of the concavo-convex board of another side open for free passage mutually, and the polymerization of each areole of the opposed face in those concavo-convex boards is carried out. A multiplex reversal interflow way is made to form by the free passage of these areole, and it changes, and is characterized by holding the above-mentioned mixed element in this casing so that ring current liquid and smoking may circulate from the inlet port of casing to an outlet through the multiplex reversal interflow way.

[0010] While carrying out the polymerization of this for the concavo-convex board of the lot in which much areole were formed, in the said alignment as a thing of two size in the above-mentioned processor and making the circumference of the concavo-convex board of a major diameter close to the inner skin of casing Drill a circulation hole in the center and the circumference of the concavo-convex board of a minor diameter is made to estrange from the inner skin of casing. It can be made to arrange in casing which is made to form a circulation way between that inner skin, piles up the plurality of this mixed element so that the concavo-convex board of the diameter of said may adjoin mutually, and has an inlet port and an outlet in both ends. Moreover, in case it piles up so that the concavo-convex board of a major diameter may be adjoined, a seal member can be infix between the seal bearing surfaces formed in the periphery of the plane of composition of those concavo-convex boards, and the seal between the concavo-convex boards of a major diameter and of between they and casing inner skin can be carried out by this seal member.

[0011] Moreover, in the above-mentioned processor, attachment and detachment of the lid in which the inlet port and the outlet were formed to the both ends of cylinder-like casing are enabled. A piece is really fabricated with an elastic body. the collar extended to the method side of inside from the both ends of the cylinder part of the outer diameter inserted in the inner skin of that casing, and this cylinder part -- While carrying out the polymerization of this in the said alignment and making the circumference of the concavo-convex board of a major diameter close to the inner skin of the cylinder part in a fit-in seal object as a thing of two size, the circular irregularity board of the lot which formed the ring-like fit-in seal object and formed much areole in the opposed face Drill a circulation hole in the center and the circumference of the concavo-convex board of a minor diameter is made to estrange from the inner skin of the cylinder part in a fit-in seal object. Make a circulation way form between that cylinder part inner skin, and it is made for the concavo-convex board of a major diameter to be located in the both ends of superposition and the fit-in seal inside of the body so that the concavo-convex board of the diameter of said may adjoin the plurality of this mixed element mutually. holding the plurality of that mixed element in the fit-in seal inside of the body -- a set element -- accomplishing -- the number of arbitration of this set element -- the inside of casing -- arranging -- a lid -- the collar of that fit-in seal object -- a piece can be bound tight and the seal of the both ends of a set element can be carried out.

[0012] In the above-mentioned freshness and color tone maintenance art, and its equipment Since it lets a blood vessel pass from the hearts, such as a fish, and a freshner, a sodium chloride, and smoking are poured in to all the corners in the living body Making a raw condition hold substantially to fish meat without promoting those osmosis uniformly and dissolving beforehand, even if it is the big fish of a fish like a tuna Freshness and the color tone maintenance effectiveness, such as discoloration prevention, can be given to preservation from decay, sterilization, drip outflow inhibition, and a pan, and it can process the whole round head as raw edible, such as sushi and sliced raw fish. And in the refrigeration or the frozen temperature acquired general comparatively easily, oxidation does not advance by osmosis of this smoking, quality maintenance under transportation for circulation is enabled, and the moderate taste, a taste, etc. are given by within the limits holding a raw condition at the same time it abolishes the need of holding to ultra low temperature which is called especially -60 degrees C.

[0013] Moreover, although it is very effective in order that using the circulatory system, such as the hearts, such as the fish, and a blood vessel, may diffuse a required component and it may make it fully permeate in order to pass the above-mentioned smoking to all the corners to the whole body, such as a large fish of a fish, it is difficult to pass only gas-like smoking in a blood vessel simply. However, by

making smoking mix as very detailed air bubbles into ring current liquid, such as a freshner, as mentioned above, and making it return to the whole body through a capillary, smoking is made to permeate the whole body easily and it becomes possible to perform whole freshness and color tone maintenance processing for a short time.

[0014] And according to the mixed element which has an above-mentioned multiplex reversal interflow way While ring current liquid passes much areole between the concavo-convex boards in the mixed element, the right-angle collision to a wall surface, Complicated flow, such as distribution, unification, meandering, and a vortex, is repeated to multiplex, smoking is formed into detailed air bubbles by this flow condition, the gas-liquid interface product per unit volume of a vapor-liquid dispersing element becomes remarkably large, and the gas absorption effectiveness which the component under smoking dissolves in ring current liquid by this improves remarkably.

[0015]

[Embodiment of the Invention] If the freshness and the color tone maintenance art of the fresh meat of this invention are explained concretely, although freshness and color tone maintenance make the required processing object carnivores, such as a fish and livestock, in this invention, it will explain below first for the fish which has lean meat with it. [an oxidation rate more remarkable than a carnivore and] [early here] Moreover, the tuna which has the lean meat with which flesh-colored degradation influences quality remarkably that processing objects, such as a fish, should just be the things of magnitude which can pour in the ring current liquid for excising the heart and aiming at freshness and color tone maintenance is the suitable object. This tuna is alive, or it is a thing soon after a postmortem and ring current liquid should just flow the inside of a blood vessel.

[0016] Although a tuna cuts the heart and the ring current liquid for freshness and color tone maintenance processing is poured in into a blood vessel the need of making it not move as it is with a certain means, or carrying out immediate killing when the tuna is alive -- it is also, since a blood vessel may be cut in immediate killing For this reason, anesthetics, such as an eugenol (EUGENOL), are used preferably. This eugenol is made to mix in the seawater (-1-0 degree C) cooled in the tsi ring tank, it is appropriate to consider as the condition of having put it to sleep by putting in a tuna into it, and "burn" according to a sudden rise of the temperature of a tuna by this processing is prevented. Although this eugenol is used abundantly in order to prevent a fish rioting in a fish farm or live fish transportation, the drug solution which replaces with this eugenol and has narcotic [other] can also be used for it.

[0017] And the freshness of a tuna and color tone maintenance processing are faced. Cut the enclosure pericardium which tears apart the antinode of a tuna perpendicularly and is under built-in, and the white bulbus arteriosus which stands in a row in the ventricle and this is taken out from under the. Although the ventricle is cut in one half, the filling pipe connected to the ring current pump which feeds ring current liquid from the ventricle is inserted in a main artery and ring current liquid is poured in with a ring current pump, warning against giving a blemish to a large blood circulatory system etc. By this, ring current liquid passes along a capillary and a vein from a main artery, it overflows from the opposite side of the ventricle which the blood or the ring current liquid poured in previously of the whole body of a fish cut, and ring current liquid is filled in the blood vessel of the whole body of a fish. In the equipment of drawing 4 later mentioned in the equipment of drawing 1 mentioned later as the above-mentioned ring current liquid, using the following 1st - the following 3rd ring current liquid one by one, it is desirable to use the following 4th ring current liquid.

[0018]

The ring-current [1st] liquid: Sodium citrate 1.0-2.0wt% water solution The 2nd ring current liquid : [Vitamin C] 3 - 5wt% -- and Vitamin E 0.5-1.5wt% water solution The 3rd ring current liquid : [Vitamin C] 3 - 5wt%, vitamin E (the detailed air bubbles of smoking mentioned later are made to mix in this ring current liquid) 0.5 - 1.5wt% -- and -- Sodium chloride 2-4wt% water solution

4th ring current liquid: -- sodium citrate 1.0 - 2.0wt% Vitamin C 3 - 5wt% Vitamin E 0.5 - 1.5wt% -- and -- Sodium chloride 2-4wt% water solution (the detailed air bubbles of smoking mentioned later are made to mix in this ring current liquid)

[0019] It is what has the effectiveness which the above and a sodium-citrate water solution function as a

blood vessel coagulation inhibition agent to a fish with freshness, and also prevents vasoconstriction. The smooth circulation of the ring current liquid to the inside of a blood vessel including a capillary is secured, and vitamin C and vitamin E function as a freshner. Moreover, a sodium chloride It is very effective, in order to raise the binding property of the texture of a tuna, to improve mouthfeel, to raise the outflow depressor effect of the drip (sap) from a fresh tuna and to take out a taste to the taste. Moreover, although a saline taste cannot be sensed to be it that the addition rate of a sodium chloride is to about 4wt% and it is desirable, if it becomes more than 8wt%, a saline taste comes to be sensed and it is not desirable. The above-mentioned freshner can replace the above-mentioned vitamin C and vitamin E with polyphenol, and can also use the freshner of others which were further defined by Food Sanitation Law.

[0020] It is for the freshness and the color tone maintenance art of the fresh meat of this invention sending in smoking through a blood vessel to all the corners, such as a fish which is a processing object, and the above-mentioned 3rd ring current liquid and the 4th ring current liquid making the smoking mix as detailed air bubbles, holding them in the condition of finally having poured in into the blood vessel of a fish, and making it permeate a fish. Although cannot pass this smoking in a blood vessel simply with the shape of a gas, therefore smoking is made to mix as very detailed air bubbles into the above-mentioned ring current liquid and it is poured into a fish, the greatest trouble in this case is that it blockades a capillary and stops passing also along smoking and ring current liquid, if air bubbles are large. Therefore, smoking is made to mix in ring current liquid as smallest possible air bubbles with smoking mixing equipment so that it may explain below.

[0021] By detailed-ization of the air bubbles of smoking made to mix into such ring current liquid, a part of smoking component in air bubbles is dissolved into ring current liquid. It is poured into a fish as mixed ring current liquid containing a smoking component and air bubbles, and the more there are many injection rates of smoking into ring current liquid in this case, the effectiveness of freshness and color tone maintenance is size, and, the more it is [the effectiveness of freshness and color tone maintenance] size that a gas-liquid interface product is large (the diameter of air bubbles is smallness). As ** material for generating the above-mentioned smoking, chips, such as the chebulae fructus which is generally wood (broad-leaved tree) with them, a Japanese oak, the Japanese oak, Buna, a walnut, and lauan, can be used. [there are few resinous principles and hard]

[0022] Moreover, by cooling the smoking with a cooling system desirably, and moreover letting it pass in filters, such as activated carbon, an aluminum oxide, or an acetic-acid cellulose As smoking which mainly filters and removes most tars under smoking, and contains the high components (an acetic acid, formaldehyde, a methanol, an acetone, a phenol, creosote, etc.) of preservation from decay, sterilization, and discoloration depressor effect While it had made the raw condition hold substantially, without giving a smell excessive as smoking, the taste, and a color to a processing object, preservation from decay, sterilization, and discoloration depressor effect are given. That from which the various filters which catch as a filter the comparatively big smoke particle which makes a tar a subject are independently used, or a mesh differs can be compounded and used, selection of this filter can adjust the tar under smoking if needed, and the moderate taste and a smell can also be given by within the limits holding the above-mentioned student's condition.

[0023] On the other hand, about 2% of the fish pile of the blood volume of a fish is common. Therefore, since in the case of a tuna with a weight of 80kg the initial complement of each above-mentioned ring current liquid is about 1.6l. and is about 1.0l. in the case of a tuna with a weight of 50kg, it should just prepare the ring current liquid of the amount exceeding them a little. Moreover, the lock out by rolling of a blood vessel can be prevented by using the equipment which can maintain a circulating load that it is desirable to circulate the amount equivalent to the above-mentioned blood volume in about 1 minute as for the circulating load of the ring current liquid in the blood vessel of a fish, and of this amount.

[0024] Thus, by making smoking return to the whole body through the capillary of a fish with ring current liquid, a smoking component is made to permeate the whole body easily, and it becomes possible to perform freshness of the whole body, and color tone maintenance processing for a short time. After pouring in the above-mentioned ring current liquid into the blood vessel of a fish for osmosis, such

as a smoking component to a fish, and a freshner, the usual refrigeration storage which can be used easily can be performed and, thereby, the impregnation component can be made to permeate fish meat. On the occasion of this refrigeration storage, where a fish is held to chilled ** using a tsi ring tank, it can carry out. In addition, although the case where a tuna was targetted above was explained, it can also consider as the object of processing of the large fish of other fishes, for example, a bonito, swordfish, buri, etc., and can apply also about livestock products.

[0025] Thus, unlike the ring current of a freshner, if the above-mentioned smoking is poured into impregnation and coincidence of the freshner into fishes, such as a tuna, as the following examples are shown Can demonstrate the effectiveness which freshness is not only held as raw edible, but was excellent in mouthfeel, the taste, the color tone, etc., and moreover, even if it is the big fish of a fish like a tuna Freshness and color tone maintenance processing can be carried out the whole round head using the circulatory system, such as the heart and a blood vessel, without disassembling it.

[0026] Next, the processor used for operation of the freshness and the color tone maintenance art of the fresh meat of this invention mentioned above is explained. It has the 3rd ring current liquid tank 1-3. fundamentally, this processor is shown in drawing 1 -- as -- the 1- respectively -- said the 1- the 3rd ring current liquid holds -- having -- moreover, the 1- the delivery valve from the 3rd ring current liquid tank 1-3 It connects with the ring current pump 14 through the closing motion valves 11-13 in the body 10 of a processor, respectively, and smoking mixing equipment 16 is connected to this ring current pump 14 by the duct 17 through a pressure control valve 15. The above-mentioned smoking mixing equipment 16 smoking which generated the ** material which is the smoking source of supply which is not illustrated in the smoke house of a **** sake Direct, Or it is made to mix into ring current liquid as detailed air bubbles, introducing through an airpipe 18 from the container which is also a smoking source of supply, and giving churning by supersonic vibration etc. in the induction to ring current liquid, after holding in a flexible container or holding in a bomb under pressurization (more than an atmospheric pressure).

[0027] By letting it pass in said filter which is not illustrated, smoking which made it generate in the smoke house which is the above-mentioned smoking source of supply mainly removes the tar under smoking, and is fed by smoking mixing equipment 16 through an airpipe 18 as smoking containing the high component of preservation from decay, sterilization, and discoloration depressor effect. In addition, 20 are the closing motion valves 11-13 in the above-mentioned body 10 of a processor, the ring current pump 14, and a drive control unit that controls the drive of pressure-control-valve 15 grade among drawing.

[0028] The filling pipe 22 of ring current liquid as shown in drawing 2 is connected at the tip of the delivery valve 21 of ring current liquid with the flexibility linked to smoking mixing equipment 16. This filling pipe 22 is formed with flexible synthetic resin, such as polyethylene, and connects the spherical sections 23 and 24 inserted in the bulbus arteriosus and the ventricles in the heart of a processing object, such as a fish and livestock, through the middle thin diameter section 25 for a clip, and makes the tip nozzle section 26 protrude at the tip of the spherical section 23.

[0029] Impregnation of the ring current liquid to the inside of the blood vessel by the above-mentioned filling pipe 22 As shown in drawing 3 , take out the bulbus arteriosus 32 which tears apart the antinode of a tuna, livestock, etc. and stands in a row in the ventricle 31 and this, and the ventricle 31 is cut in one half in a cutting plane C. While inserting in a main artery 33 through a bulbus arteriosus 32 from the ventricle 31 from which the tip nozzle section 26 of a filling pipe 22 was cut and inserting the spherical section 23 in a bulbus arteriosus 32, it is in the condition which inserted the spherical section 24 in the ventricle 31, and carries out by fixing so that it may not escape from the middle thin diameter section 25 with a clip. the 1- chosen by the closing motion valves 11-13 while making it mix in ring current liquid by using smoking as minute air bubbles in smoking mixing equipment 16 by driving said ring current pump 14 in this condition -- the ring current liquid from the 3rd ring current liquid tank 1-3 is sendable into blood vessels, such as a fish.

[0030] In addition, the proper structure from which can fix easily not only to the filling pipe 22 of such structure but to the heart, and it is hard to escape is employable. Moreover, although a configuration which is made to mix to ring current liquid by using smoking as detailed air bubbles by churning by

supersonic vibration etc. is also employable as smoking mixing equipment 16 in the above-mentioned freshness and color tone maintenance processor as mentioned above, the smoking mixing equipment 50 which has the multiplex reversal interflow way of a configuration of explaining below can also be used. [0031] It faces that the processor which has the above-mentioned configuration performs freshness and color tone maintenance processing. Where the tip nozzle section 26 of a filling pipe 22 is inserted in a main artery 33 from the ventricle 31 in processing objects, such as a fish and a meat beast The ring current pump 14 is driven, sequential disconnection of the closing motion valves 11-13 is carried out, and the ring current liquid from the ring current liquid tanks 1-3 is sent into the blood vessel of a fish one by one, and is replaced with blood or the ring current liquid fed previously. Namely, by opening the closing motion valve 11 wide and pouring in first, the 1st ring current liquid prepared for the 1st ring current liquid tank 1 with the ring current pump 14 The blood of a processing object is replaced with the 1st ring current liquid. Next, the 2nd ring current liquid of the 2nd ring current liquid tank 2 It changes for the 1st ring current liquid by opening the closing motion valve 12 wide and pouring in with the ring current pump 14. Furthermore, the 3rd ring current liquid of the 3rd ring current liquid tank 3 is poured in with the ring current pump 14 by actuation of the closing motion valve 13, and smoking is made to mix by actuation of the smoking mixing equipment 16 using an ultrasonic vibrator on the occasion of the impregnation as detailed air bubbles (50 micrometers or less of diameters of air bubbles).

[0032] Thus, after making smoking return to a fish with the 3rd ring current liquid, in order to make them permeate the whole body, in the tsi ring tank filled up with the seawater cooled at -1-0 degree C or a refrigerator, a freezer, etc., freshness and color tone maintenance processing of the whole body of a processing object can be performed by carrying out refrigeration storage for about 24 hours, and making the impregnation component permeate fish meat.

[0033] Drawing 4 shows the gestalt of other operations of the above-mentioned freshness and color tone maintenance processor. The ring current liquid tank 4 by which this processor holds the freshner as ring current liquid, The circulating flow way 43 which infixes the circulating pump 41 and the closing motion valve 42 which circulate the ring current liquid in the ring current liquid tank 4, It has smoking mixing equipment 50 with which smoking fed through an airpipe 44 from smoking sources of supply, such as said smoke house which it is infixes all over this circulating flow way 43, and is not illustrated, and a bomb, and ring current liquid are mixed. Moreover, the delivery valve 47 equipped with the closing motion valve 45 and the ring current pump 46 is connected to the above-mentioned ring current tank 4. The filling pipe 22 as shown in said drawing 2 is connected to this delivery valve 47. In addition, 48 are an exhaust valve among drawing.

[0034] This processor so that the mixed ring current liquid (said 4th ring current liquid) which mixed smoking with the ring current liquid of the circulating flow way 43 may be explained below Always carrying out a circulation mixing flow in smoking mixing equipment 50, it holds in the ring current liquid tank 4, and this cellular mixing ring current liquid is poured in into the blood vessel of a processing object like the example of said drawing 1 through a delivery valve 47 with the ring current pump 46 linked to the ring current liquid tank 4. In addition, when using a sodium-citrate water solution, the water solution of a freshner, the ring current liquid that added the sodium chloride to the water solution of the freshner further one by one, selection use of the ring current liquid which installed two or more ring current tanks, and was held in them can also be carried out like the example of drawing 1.

[0035] Drawing 5 - drawing 8 show the concrete example of a configuration of the above-mentioned smoking mixing equipment 50. As the casing 51 in this smoking mixing equipment 50 is shown in drawing 5, it is equipped with the tabular lids 53 and 55 which the flanges 52a and 52b which project in the direction of a periphery, respectively were formed in the both ends of the cylinder-like housing main body 52, and formed the inlet port 54 and the outlet 56 in the center at the end face of those flanges 52a and 52b free [attachment and detachment]. The mixed element 57 which carries out array hold in the direction of an axial center in the interior of the hollow of a housing main body 52 The disc-like concavo-convex boards 58 and 59 of two size shown in drawing 6 and drawing 7 are made into a lot. The small standing walls 60 and 61 are protruded at right angles to the opposed face which those concavo-convex boards 58 and 59 counter mutually, and much areole 62 and 63 of the shape of a

cylinder like object with base whose front view of front disconnection is a polygon-like are aligned by these small standing walls 60 and 61, it arranges, and the polymerization of these concavo-convex boards 58 and 59 is carried out in the said alignment.

[0036] The circulation hole 64 was drilled in the center, on the other hand, the concavo-convex board 59 of a minor diameter made the circumference estrange from the inner skin of casing 51, and the concavo-convex board 58 of said major diameter has accomplished it with the magnitude by which the circulation way 65 is formed between these inner skin while forming it in the outer diameter which the circumference is made close to the inner skin of casing 51, and can acquire a watertight. And as shown in drawing 8, when carrying out the polymerization of those concavo-convex boards to the areole 62 of the concavo-convex board 58 of a major diameter, and the areole 63 of the concavo-convex board 59 of a minor diameter in the said alignment, can shift those locations, it is made to arrange and the multiplex reversal interflow way is made to form by the free passage of those areole 62 and 63 so that it may be mutually open for free passage to the plurality of the areole 63 and 62 in the concavo-convex boards 59 and 58 of another side.

[0037] The mixed element 57 which consists of the lot of the disc-like concavo-convex boards 58 and 59 of such two size piles up the plurality so that the concavo-convex board of the diameter of said may adjoin mutually, and it is arranged in the interior of the hollow of casing 51 in serial. Moreover, the concavo-convex board 58 of a major diameter is arranged, respectively, and both ***** of the mixed element 57 of the serial condition held in casing 51 are made to open each circulation hole 64 of the concavo-convex board 58 of those major diameters, and the inlet port 54 and outlet 56 in lids 53 and 55 of casing 51 for free passage. Thereby, the above-mentioned mixed element 57 is held in this casing 51 so that ring current liquid and smoking may circulate from the inlet port 54 of casing 51 to an outlet 56 through the multiplex reversal interflow way.

[0038] In addition, although the above-mentioned example showed what was arranged in the shape of a honeycomb by making the front view configuration of areole 62 and 63 into a hexagon head, it is not limited to this configuration, and the front view configuration of these areole 62 and 63 can be made into the shape of a polygon, such as a trigonum, a rectangular head, and eight angles, and can also be made circular.

[0039] Next, the mechanism of mixing with smoking with the above-mentioned smoking mixing equipment 50 and ring current liquid is explained. When the building envelope of casing 51 is made to carry out the pressurization inflow of the fluid of ring current liquid and vapor-liquid of smoking 2 component from the inlet port 54 of the lid 53 in smoking mixing equipment 50, the flow of this fluid As an arrow head shows in drawing 5, the interior is arrived at from the circulation hole 64 of the concavo-convex board 58 of the major diameter in the mixed element 57 of the upstream. A rectilinear-propagation course is barred by the concavo-convex board 59 of a minor diameter, and a direction is changed, and through the areole 62 and 63 which are mutually open for free passage, toward an outside, conditions, such as a right-angle collision, distribution, unification, meandering, and a vortex, combine in a radial, and it flows from a center section intricately to it (multiplex reversal mixing flow).

[0040] Thus, the fluid which passed through the multiplex reversal interflow way in the mixed element 57 of the upstream, and reached the inner skin of casing 51 It goes into each areole 62 and 63 of the mixed element 57 of the downstream from the circulation way 65 formed of the inner skin of the casing 51, and the concavo-convex board 59 of a minor diameter. Gather in the center section by complicated flow, such as the above right-angle collisions, distribution, unification, meandering, and a vortex, and it goes into this mixed element 57 again from the circulation hole 64 of the concavo-convex board 58 of the major diameter in the mixed element 57 of the next step. Passing through each areole 62 and 63 again, toward an outside, the inside of the mixed element 57 is intricately flowed according to a right-angle collision, distribution, unification, meandering, a vortex, etc., and by repeating this flow condition, it will be in the condition that a part for a gas was formed into detailed air bubbles, and air bubbles were intermingled, and will be discharged from the outlet 56 of a lid 55.

[0041] If it explains still more concretely about a flow in the mixed element 57, the ring current liquid which passes through the inside of this mixed element 57 As mentioned above, the right-angle collision

to the base and the small standing walls 60 and 61 of each areole 62 and 63, The distribution to two or more of other areole 62 and 63 from each areole 62 and 63, the unification to other one areole [areole / 62 and 63 / two or more] 62 and 63, Meandering, the hydrodynamic shear produced in the vortex accompanying the inflow to each areole 62 and 63 from further two or more areole 62 and 63, By the shear at the time of passing through the upper limit side of the hydrodynamic shear at the time of passing the orifice which is a free passage way to other areole [areole / 62 and 63 / each] 62 and 63, grinding by shocking destruction, and the small standing walls 60 and 61, mechanical cavitation, etc. The amount of [of smoking] gas forms detailed air bubbles, and distributed mixing is performed. Therefore, in smoking mixing equipment 50, the gas-liquid interface product per unit volume of a vapor-liquid dispersing element can be enlarged remarkable, and the gas absorption effectiveness which the component under smoking dissolves in ring current liquid by this will improve remarkably.

[0042] Here about the distributed total of the mixed element 57 In the thing of the shape of a front view hexagon head which is determined by the number of rooms of the areole 62 and 63 in the concavo-convex boards 58 and 59 of two size arranged from the core to the radial one by one, for example, is shown in drawing 6 and 7 The concavo-convex board 58 of six rooms, 12 rooms, and 18 rooms (a total of 36 rooms) respectively 3 seriate to the outside from the inside in the number of rooms, If the distributed total in the case of one total fluid in the mixed element 57 to which the number of rooms carried out the polymerization of the same 3 seriate irregularity board 59 of three rooms, nine rooms, and 15 rooms (a total of 27 rooms) amounts also to thousands of times and is two or more fluids, naturally it will become the multiplier product.

[0043] In addition, the above-mentioned distributed total is a number with which the fluid which should be produced while passing the mixed element 57 in the concavo-convex board 58 and the concavo-convex board 59 by the areole 62 and 63 which are mutually open for free passage is distributed, and when it consists of two or more mixed elements 57, it can become the product of each distributed total of the mixed element 57, and can fluctuate suitably by fluctuating the number of trains of areole 62 and 63.

[0044] Moreover, in the above-mentioned smoking mixing equipment 50, while making the front view configuration of areole 62 and 63 into a hexagon The mixed element 57 which consists of the concavo-convex board 58 of the major diameter which made the number of rooms of areole 62 48 rooms, and the concavo-convex board 59 of the minor diameter which made the number of rooms of areole 63 30 rooms Two units, four units, six units, and four kinds of smoking mixing equipments that carried out 10 unit interior are used into casing 51, respectively. When pressurization supply of the vapor-liquid 2 component of water and air is carried out, a building envelope is passed once and the diameter of air bubbles in the outlet 52 of smoking mixing equipment is measured, it is admitted that detailed air bubbles are formed by 45 micrometers - about 66 micrometers. It is clear by repeating vapor-liquid mixing the diameter's of smoking of the mixed ring current liquid in which it is checked that a gas-liquid interface product becomes remarkably large, therefore at least one passage is held in the ring current tank 4 of drawing 4 by this though natural, and it is made to mix smoking repeatedly with smoking mixing equipment 50 of air bubbles to be further made detailed.

[0045] In the above-mentioned mixed element 50, it can replace with the concavo-convex boards 58 and 59 of two size, and the concavo-convex boards 70 and 71 of a configuration as shown in drawing 9 and drawing 10 can be used. Although these concavo-convex boards 70 and 71 arrange much areole 74 and 75 of front disconnection by protruding the small standing walls 72 and 73 like the example of drawing 5 - drawing 8 at right angles to the opposed face which the concavo-convex boards 70 and 71 counter mutually The projections 76 and 77 made lower than the height of the upper limit side of the small standing walls 72 and 73 which form areole 74 and 75 in the base of each of those areole 74 and 75 are formed. Although it becomes possible to make the flow of a fluid produce turbulence positively, and projections 76 and 77 are made small one by one as a core is approached from the periphery of the concavo-convex boards 70 and 71 if these projections are prepared The content volume of the outside and the inside in the diameter direction of the areole 74 and 75 arranged by the circumferencial direction can be equalized by this, pulsation of the ring current liquid which flows that can be prevented, and

smooth flow can be secured. In addition, since other configurations and operations do not have the example of said drawing 5 $R > 5$ - drawing 8, and the changing place, they attach the sign identically same into a considerable part, and omit those explanation.

[0046] Drawing 11 and drawing 12 show other examples of a configuration of the smoking mixing equipment in this invention. The casing 81 in this smoking mixing equipment 80 The flanges 82a and 82b which project in the direction of a periphery, respectively are formed in the both ends of the cylinder-like housing main body 82. It is equipped with the lids 83 and 85 which have the inlet port 84 and outlet 86 which are connected to those flanges 82a and 82b on the circulating flow way 43 of drawing 4 free [attachment and detachment]. In this casing 81, it has held and equipped with the mixed element 87 of a required number in the fit-in seal object 96 really fabricated with the elastic body.

[0047] The above-mentioned mixed element 87 makes a lot the disc-like concavo-convex boards 88 and 89 of two size like said example. By protruding the small standing walls 90 and 91 on the opposed face which those concavo-convex boards 88 and 89 counter mutually, make much areole 92 and 93 arrange and it forms. The circulation hole 94 is drilled in the center at the concavo-convex board 88 of a major diameter, the polymerization of these concavo-convex boards 88 and 89 is carried out in the said alignment, and two or more areole of the concavo-convex board of another side are made to open each areole for free passage mutually. moreover, the collar which the fit-in seal object 96 which holds the plurality of the above-mentioned mixed element 87 forms cylinder part 96a with the outer diameter which is made to possess the clearance between some and is inserted in the shape of loosely fitting between the inner skin of a housing main body 82 with elastic bodies (nitrile rubber, silicone rubber, etc.) with the seal nature used as packing, a gasket, etc., and is extended from the both ends of this cylinder part 96a to inboard -- piece 96b is really fabricated.

[0048] Hold into the fit-in seal object 96 of the above-mentioned mixed element 87 to which the polymerization of the concavo-convex boards 88 and 89 was carried out in the said alignment While making the circumference of the concavo-convex board 88 of a major diameter close to the inner skin of cylinder part 96a in the fit-in seal object 96 The circumference of the concavo-convex board 89 of a minor diameter is made to estrange from the inner skin of cylinder part 96a in the fit-in seal object 96. Make the circulation way 95 form between that cylinder part inner skin, and it is made for the concavo-convex board 88 of a major diameter to be located in the both ends within superposition and the fit-in seal object 96 so that the concavo-convex board of the diameter of said may adjoin the plurality of this mixed element 87 mutually. It is carried out by holding the plurality of the mixed element 87 in the fit-in seal object 96, and, thereby, the set element 98 (refer to the exploded view of drawing 12) is formed.

[0049] Although that number of arbitration is arranged to the centrum of casing 81 in serial and this set element 98 holds it in it By binding lids 83 and 85 tight with a bolt to the flanges 82a and 82b of a housing main body 82, and fixing Each piece of ** 96b of the fit-in seal object 96 in the set element 98 is bound tight, the seal of the both ends of each set element 98 is carried out, and the passage which carries out the sequential free passage of the multiplex reversal interflow way in each mixed element 87 is formed in casing 81.

[0050] Namely, the axial center lay length (car a collar die length between the medial surfaces of piece 96b) of cylinder part 96a in the fit-in seal object 96 It is made in agreement with the axial center lay length in the condition of having piled up two or more mixed elements 87 (drawing 11 a total of four sheets of the concavo-convex large and small boards 88 and 89), in general so that drawing 11 may show. each collar of the fit-in seal object 96 -- the sum total die length of two or more set elements 98 which can be set in the condition of having contacted piece 96b is greatly set as extent which has bolting cost to the dimension between the both ends of a housing main body 82. therefore, the collar of the fit-in seal object [in / to the time of bolting of lids 83 and 85 / each set element 98] 96 -- at the same time thrust joins piece 96b, respectively, each piece of ** 96b carries out a compression set by this thrust and the pressure welding of both the upper limit of the small standing walls 90 and 91 is certainly carried out by the elastic stability in that case -- the collar of the fit-in seal object 96 -- the seal function by piece 96b becomes a positive thing.

[0051] In addition, in case the thrust by bolting of lids 83 and 85 is insufficient, thrust can be adjusted

by infixing SU **-SA (not shown) of the shape of a monotonous ring which consists of an elastic body into casing 81. Moreover, what is necessary is just to enlarge the dimension between the both ends of the set element 98 a little from the dimension between the both ends of casing 81, in holding the simple substance of the above-mentioned set element 98 in casing 81.

[0052] By equipping the both ends of casing 81 with lids 83 and 85, and carrying out pinching immobilization of the set element 98 in the processor which has the above-mentioned configuration A seal is carried out by piece 96b. at the same time the concavo-convex boards 88 and 89 are firmly maintainable in the adhesion condition -- between the concavo-convex board 88 and lids 83 and 85 and between concavo-convex board 88 -- the collar of the fit-in seal object 96 -- Moreover, since the seal of the periphery of the concavo-convex board 88 of a major diameter is carried out with the fit-in seal object 96, a simplistic flow of the ring current liquid generated by the leakage from passage and poor distributed mixing by the pulsating flow can be prevented. In addition, since other configurations and operations do not have a place explaining the example of drawing 5 - drawing 8, and the changing place, those explanation is omitted here.

[0053] Drawing 13 - drawing 18 show the example of a configuration of further others of the above-mentioned smoking mixing equipment. This smoking mixing equipment 100 is what ensures the seal between the passage and the mixed element in a mixed element, and casing inner skin as compared with the smoking mixing equipments 50, such as said drawing 5. In the mixed element 107 in the casing 101 equipped with the housing main body 102 and the lid 103,105 The configuration of the areole 112,113 formed of the small standing wall 110,111 and them in the concavo-convex board 108,109 Although there are not a case of said smoking mixing equipment 50 and a place which changes substantially, it sets to the concavo-convex board 108 of a major diameter. While forming the outer diameter in the inner skin of a housing main body 102, and the magnitude (extent used as the letter of loosely fitting) which is not stuck The truncated-cone-like plinth section 121 is really formed and the seal bearing surface 122 is formed in the tooth-back side in which the areole 112 in the concavo-convex board 108 are not formed at the periphery side of this plinth section 121.

[0054] A half-rate groove, nothing, and those seal bearing surfaces 122,103b and 105b are formed in the shape of a taper side, and this seal bearing surface 122 enables it to insert the ring-like seal member 125 in this seal groove 124, in order to form a seal groove 124 between the seal bearing surface 122 of other concavo-convex boards 108 which counter, or the below-mentioned seal bearing surfaces 103b and 105b in a lid 103,105. As a seal bearing surface 122 in the concavo-convex board 108 of the above-mentioned major diameter, as shown in drawing 19, it can constitute, namely, the plinth section 132 of the shape of a flat cylinder can be formed in the concavo-convex board 131, and the seal bearing surface 133 which caved in on the periphery of this plinth section 132 can also be formed in the shape of a half-rate square groove. As a seal member 125, an O ring, an X ring, a D ring, etc. can be used, and there are nitrile rubber, silicone rubber, a fluororubber, acrylic rubber, Teflon (trade name), etc. also about the quality of the material.

[0055] Moreover, while forming two or more arms 135 to which it points at the core from the inside of that circulation hole 114 in the core of the circulation hole 114 which pierces through the core of the concavo-convex board 108 of a major diameter, really forming a hub 136 at that tip and forming a boss 137 in the core of this hub 136, the spot facing section 138 formed in the concave in the predetermined depth is formed in the plinth section 121 around the circulation hole 114 by the side of the tooth back of the concavo-convex board 108.

[0056] On the other hand, while protruding the cylinder-like boss 141 and forming a screwhole 142 at this boss's 141 core, two or more fitting pins 143 which fit into the outside of the same field with the areole 112 of the arbitration of the outermost part in the concavo-convex board 108 of a major diameter are protruded at the core of an opposed face with the concavo-convex board 108 in which areole 113 are formed in the concavo-convex board 109 of a minor diameter. And as shown in drawing 17, by making the areole 112,113 prepared in the opposed face of the concavo-convex board 108,109 counter, and thrusting the concavo-convex board 108,109 into a boss 137 through the stop screw 145 superposition and after that at a screwhole 142 like said example, the concavo-convex board 108,109 of two size is

connected, and it is making with the mixed element 107.

[0057] Moreover, a bolt insertion hole is prepared in the flanges 102a and 102b of a housing main body 102. To the lid 103,105 formed, respectively, the inlet port 104 with which the both ends of this housing main body 102 are equipped, and an outlet 106. The cylinder projected parts 103a and 105a inserted in the opening circles of housing-main-body 102 both ends in the shape of loosely fitting are formed. The same seal bearing surfaces 103b and 105b as said concavo-convex board 108 are formed in the periphery side at the tip of these cylinder projected parts 103a and 105a. The through tube of the proper number which inserts an adjusting bolt 148 is formed in the above-mentioned flanges 102a and 102b in a lid 103,105, and the part which counters.

[0058] Wearing of the mixed element 107 into the above-mentioned casing 101 First, one opening of a housing main body 102 is suitably equipped with one lids 103 or 105 with the adjusting bolt 148 of a number. Connect the concavo-convex board 108,109 of two size with the stop screw 145 beforehand, and the mixed element 107 is made to form. Moreover Many mixed elements 107 in order of the seal member 125 and the mixed element 107 from opening of a housing main body 102 in serial And concavo-convex board 108 comrades of a major diameter and concavo-convex board 109 comrades of a minor diameter adjoin. It is made to arrange so that the seal member 125 may be located between concavo-convex board 108 comrades of a major diameter, holds, and, finally is carried out by equipping a housing main body 102 with the lid of another side with an adjusting bolt 148 through the seal member 125.

[0059] Between the seal bearing surface 122 in the concavo-convex board 108 of the major diameter located between the seal bearing surfaces 122 of the concavo-convex board 108 of each major diameter in the adjoining mixed element 107, and in both endmost parts by this, and the seal bearing surfaces 103b and 105b in the cylinder projected parts 103a and 105a of a lid 103,105, the seal groove 124 of the letter of the abbreviation for V characters or the letter of the abbreviation for U characters is formed, and these seal grooves 124 are equipped with the seal member 125. A lid 103,105 is in the condition which inserted the cylinder projected parts 103a and 105a into opening of the both ends of a housing main body 102, it is suitably bound tight moderately with the adjusting bolt 148 of a number, and, thereby, the seal member 125 of the shape of a ring to which the predetermined squeeze is given by a seal groove 124 and housing-main-body 102 inner skin is bound tight.

[0060] In the smoking mixing equipment 100 which has such a configuration Only by putting in the seal member 125 and the mixed element 107 in a housing main body 102 one by one It can equip with the seal member 125 in a seal groove 124, and a seal can be carried out so that the simplistic flow of the fluid from between the outer diameter of the concavo-convex board 108 of a major diameter and the inner skin of casing 101 may be regulated by this seal member 125. And since the periphery of the concavo-convex major diameter board 108 is not directly close to the inner skin of the body 102 of casing, it is not necessary to make into a precision process tolerance of the inner skin of casing which arranges two or more mixed elements 107, and processing of the casing itself also becomes easy. Furthermore, since a taper side turns into guide plane at the time of wearing of the seal member 125 so that drawing 18 may show in accomplishing the seal bearing surface 122 with the shape of a taper side, a viewing-check can prevent the poor seal by bite lump of the seal member within difficult casing.

[0061] moreover, also about the fluid which is going to leak from between cylinder projected part 103a of a lid 103,105, a 105a end face, and the tooth backs of the concavo-convex board 108 of the major diameter of the mixed element 107 Since it is equipped with the seal member 125 in the seal groove 124 formed by the seal bearing surfaces 103b and 105b of the cylinder projected parts 103a and 105a, and the seal bearing surface 122 of the concavo-convex board 108, The leakage by the exterior from cylinder projected part 103a and a 105a periphery can be prevented, and the gaskets generally prepared to the periphery side of the cylinder projected parts 103a and 105a become unnecessary. In addition, since other configurations and operations in this smoking mixing equipment 100 do not have the case of said smoking mixing equipment 50, and the changing place, the explanation about them is omitted.

[0062]

[Example] Below, the example of the freshness and the color tone maintenance art of this invention is

shown. In onboard [which captures a tuna], the tuna put in seawater more than one half into the tsi ring tank of magnitude containing being reasonable, put in ice further, and cooled water temperature at -1-0 degree C, and about 10 ppm (EUGENOL) of eugenols of the anesthetic used for fishes were put in into the seawater. When the captured tuna was put into this tsi ring tank in the condition of being alive, the motion was almost able to stop in several seconds and the following freshness and the color tone maintenance processings were able to be smoothly performed after 1 minute.

[0063] About the tuna which is in an anesthetic condition by the above-mentioned processing, in order to check the effectiveness of freshness and color tone maintenance processing, the following processings were performed. On the occasion of freshness and color tone maintenance processing of these tunas, the enclosure pericardium which tears apart the antinode of a tuna perpendicularly and is under internal organs was cut, the white bulbus arteriosus 32 which stands in a row in the ventricle 31 and this like the triangle of the blackish brown explained by drawing 3 was taken out from under the enclosure pericardium, and the ventricle 31 was cut in one half in the cutting plane C, warning against giving a blemish to a large blood circulatory system etc. Next, while inserting the tip nozzle section 26 of the filling pipe 22 as shown in drawing 2 in the main artery 33 through the bulbus arteriosus 32 from the cut ventricle 31 and inserting the spherical section 23 in the bulbus arteriosus 32, where the spherical section 24 is inserted in the ventricle 31, it fixed so that it might not escape from the middle thin diameter section 25 with the clip which stuck soft rubber on the pinching side. About freshness and color tone maintenance processing of this tuna, the sample was created by impregnation of the following ring current liquid using the equipment shown in the equipment substantially shown in drawing 1, and drawing 4.

[0064] Sample 1 (example of a comparison) : by letting the above-mentioned filling pipe 22 pass, and pouring the sodium-citrate 1.5wt% water solution (the 1st ring current liquid) prepared for the 1st ring current liquid tank of the equipment of drawing 1 for about 1 minute The above-mentioned 1st ring current liquid was transposed to the 2nd ring current liquid by replacing the blood of a tuna with the 1st ring current liquid, and pouring the water solution (the 2nd ring current liquid) of a freshner (vitamin C: 4wt% and vitamin-E:1wt%) for about 1 minute after that.

[0065] Sample 2: After replacing the blood of a tuna with the 1st ring current liquid like the case of a sample 1, smoking was replaced with the mixed ring current liquid mixed as detailed air bubbles to the 3rd ring current liquid (vitamin C: water solution of 4wt% and vitamin-E:1wt% and 3% of sodium chlorides) with the processor of drawing 4 using the smoking mixing equipment 50 of drawing 5. The amount of mixing of smoking was aimed at 1l. to about 2l. of 3rd prepared ring flow liquid.

[0066] Sample 3: It replaced with the mixed ring current liquid which mixed smoking in the 4th ring current liquid (sodium citrate: water solution of 1.5wt% and vitamin-C:4wt% and vitamin-E:1wt% and 3% of sodium chlorides) like the sample 2 with the processor of drawing 4 [blood / of a tuna] using the smoking mixing equipment 50 of drawing 5.

[0067] Sample 4: The blood of a tuna was replaced [like the case of a sample 1] with the mixed ring current liquid which mixed smoking as detailed air bubbles to the 3rd ring current liquid like the case of a sample 2 with the processor of the 1st ring current liquid and drawing 4 [liquid / this / 2nd ring current] subsequently to the 2nd ring current liquid replace, and using the smoking mixing equipment 50 of drawing 5 further.

[0068] Thus, after replacing the blood of a tuna with ring current liquid, in order to make them permeate a fish, put in the fish all over the seawater cooled at -1-0 degree C in the tsi ring tank, carried out refrigeration storage for 24 hours, the impregnation component was made to permeate fish meat, and freshness and color tone maintenance processing of the whole body were performed.

[0069] After carrying out predetermined time storage of the tuna of each sample which carried out above-mentioned freshness and color tone maintenance processing at a tsi ring tank, the result of having cut and having investigated the condition of texture and aging of a color tone was as follows. By the sample 1, freshness and a color tone maintenance period have extended till about about 42 - 50 hours compared with the thing which is not processed [conventional] (only in case of blood removal processing). On the other hand, by samples 2-4, freshness and a color tone maintenance period have

extended at the lowest till about 95 hours. Moreover, in samples 2-4, there is no great difference in the color tone degradation suppression effectiveness, and both scarlet colors were presented after the frozen preservation for two weeks.

[0070] Although the filter which filters smoking was small and the tuna processed using smoking with few amounts of removal of a tar had a peculiar smoking smell and peculiar flavor The tuna processed using smoking which used the large thing of a filter and fully removed the tar does not have a smoking smell, the moderate taste, the taste, the smell, etc. were given by within the limits holding a raw condition, and it was checked further that freshness and a color tone can be held over a long period of time. Moreover, most outflows of a drip (sap) were not seen. Thus, when the ring current liquid which mixed smoking into the fish of a tuna was poured in, freshness is not only held as raw edible, but it has checked as follows that there was effectiveness which was excellent in mouthfeel, the color tone, the taste, etc.

[0071] (b) Mouthfeel became very good. A drip (sap) outflow is controlled in an operation of a sodium chloride, and this is considered because the binding property of texture became good.

(b) The color tone degradation suppression effectiveness improved very much. This is considered to be the effectiveness by the high component of the preservation from decay under smoking, sterilization, and the discoloration prevention effectiveness.

(c) The freshness holding time was able to be made to extend. This is considered to be the synergistic effect by the high component of the effectiveness of a freshner, and the bactericidal effect under smoking etc.

(2) Flavor became good. This is considered to be the effectiveness by the component of smoking.

(e) The taste became good. This is considered to be the effectiveness of salinity.

[0072] In addition, when only the ring current liquid containing a sodium chloride was poured in without adding smoking, since salinity was poured in into the meat of a tuna through a blood vessel, the depressor effect of a drip (sap) improved much more, but on the other hand, when salinity promoted METO-ization and smoking was added to this, it was also confirmed that the above-mentioned METO-ization can be controlled.

[0073] It is epidermis's hard [of a tuna] intercepting the open air , while putting into the tsi ring tank after injecting smoking into the inside of the body of a tuna through a blood vessel in the description of everything but this freshness obtained in the above-mentioned example using the blood vessel of a tuna , and color tone maintenance processing in ring current liquid , carrying out chilled refrigeration and saving , and wrapping smoking of the inside of the body of a tuna with a sufficient degree , and making the inside of the body of a tuna carry out osmosis promotion of the osmosis of smoking uniformly . Furthermore, with the smoking mixing equipment which has said multiplex reversal interflow way, the gas-liquid interface product per unit volume of a vapor-liquid dispersing element can be enlarged remarkable with easy structure, and as a result of the gas absorption effectiveness which the component under smoking dissolves in ring current liquid by this improving remarkably, the effectiveness of the expected more than was able to be demonstrated.

[0074]

[Effect of the Invention] Without according to the freshness, the color tone maintenance art, and equipment of fresh meat of this invention which were explained in full detail above, disassembling it, even if it is the big fish of a fish etc. like a tuna, it can process the whole round head and the taste as raw edible, such as sushi and sliced raw fish, freshness, and a color tone can be made to hold over a long period of time. In a circulation phase until it results in a consumer after capturing a tuna etc., oxidation is controlled also in the refrigeration temperature acquired easily. Substantially namely, in the raw condition By the former, what had to be discarded can keep one day after about two - four days for a long time by this by comparing the freshness with the former and being able to hold over a long period of time, therefore it becomes very useful in respect of waste of fishing resources and cost. moreover, considerable between what was cooked first, and the thing cooked at the last, in case the sliced raw fish for a lot of people is prepared at a hotel, a hotel, etc. -- time -- it can set the table, without opening and reducing freshness and a color tone as ***.

[0075] And it makes those components permeate for a short time at the whole body , such as a fish , by pour in smoking which is valid or has preservation from decay , sterilization , and the discoloration prevention effectiveness using blood vessels , such as a fish soon after a postmortem , to the interior , such as a fish , and it not only enables freshness under transportation for circulation , and maintenance of quality , but mouthfeel and a taste are improvable [hold a raw condition , as mention above].

[0076] When the smoking mixing equipment equipped with the mixed element which has a multiplex reversal interflow way in above-mentioned freshness and color tone maintenance processing is used, moreover, ring current liquid and smoking A sequential flow is carried out repeating diffusion and a set from the upstream to the downstream through the areole which are mutually open for free passage. The diameter of air bubbles of smoking is remarkably made detailed by the big distributed total by complicated flow of combination, such as a right-angle collision to the field of the side attachment wall and others of the areole in the flow process, distribution to other areole [areole] and unification, meandering, and a vortex, etc. Therefore, smoking is made detailed with easy equipment, it pours in into the blood vessel of a processing object, and can replace with blood, and smoking can be made to be able to return to the whole body through the capillary of a fish with ring current liquid, and smoking can be made to permeate the whole body easily by this.

[0077] And since a flow of ring current liquid and smoking becomes complicated as mentioned above, while the simplistic flow of a fluid is lost and the contacting efficiency of ring current liquid and smoking improves A gas-liquid interface product's becoming remarkably large and the gas absorption effectiveness which the component under smoking dissolves in ring current liquid conjointly improve remarkably. It becomes possible to perform freshness maintenance processing of the whole body for a short time, and further, diffusion with a mixed element and the flow direction of a set are radial, and since they are crooked intricately, they are small, can lengthen passage length and can attain the miniaturization of smoking mixing equipment.

[0078] moreover, when a mixed element is held in a fit-in seal object or a seal member is infixed between the seal bearing surfaces of the periphery of the plane of composition of the concavo-convex board While maintaining the concavo-convex board in the adhesion condition firmly by equipping the both ends of casing with a lid and carrying out pinching immobilization of the set element, a simplistic flow of the ring current liquid generated by the leakage from the passage between the concavo-convex boards and poor distributed mixing by the pulsating flow can be prevented.

[0079] furthermore, when a seal member is infixed between the seal bearing surfaces of the periphery of the plane of composition of the concavo-convex board Only by carrying out sequential insertion and only holding a mixed element in casing While a seal groove can be formed between seal bearing surfaces and the assembly of smoking mixing equipment becomes very easy since it can equip with a seal member in a seal groove

*** NOTICES ***

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] It faces pouring in the ring current liquid for replacing with the blood in a blood vessel through the artery of the processing object which is a fish or a meat beast, and aiming at freshness and color tone maintenance. As the above-mentioned ring current liquid The freshness and the color tone maintenance art of the fresh meat characterized by what is made for the impregnation component to permeate meat by refrigeration storage after pouring it in into the blood vessel of a processing object using the thing which made smoking mix in the water solution of a freshner as minute air bubbles.

[Claim 2] The freshness and the color tone maintenance art of the fresh meat according to claim 1 characterized by what a sodium chloride is added for to ring current liquid.

[Claim 3] The freshness and the color tone maintenance art of the fresh meat according to claim 1 characterized by the thing using the thing which made smoking mix in the water solution containing a sodium citrate, a freshner, and a sodium chloride as minute air bubbles as ring current liquid.

[Claim 4] It faces pouring in the ring current liquid for replacing with the blood in a blood vessel through the artery of the processing object which is a fish or a meat beast, and aiming at freshness and color tone maintenance. Transpose blood to a sodium-citrate water solution first, next the sodium-citrate water solution is transposed to the water solution of a freshner. Furthermore, while adding a sodium chloride for the water solution of the freshner to the water solution of a freshner, smoking is transposed to the ring current liquid made to mix as minute air bubbles. The freshness and the color tone maintenance art of the fresh meat characterized by what is made for the impregnation component to permeate meat by refrigeration storage after pouring it in into the blood vessel of an object.

[Claim 5] In freshness and a color tone maintenance art according to claim 1 to 4 The concavo-convex board of two sheets which protruded the small standing wall on the opposed face which counters mutually on the occasion of the water solution of a freshner for making it mix smoking as detailed air bubbles, and formed much areole by the small standing wall is made into a lot. In the mixed element which two or more areole of the concavo-convex board of another side were mutually made open for free passage, and carried out the polymerization of each areole of the opposed face in those concavo-convex boards The freshness and the color tone maintenance art of the fresh meat characterized by what you circulate vapor-liquid 2 component of the water solution of the above-mentioned freshner, and smoking through the multiplex reversal interflow way formed of the free passage of these areole, and is made by this for the water solution of the above-mentioned freshner to distribute smoking as a detailed particle.

[Claim 6] The freshness and the color tone maintenance art of the fresh meat characterized by the thing using the fish which has lean meat as a processing object in freshness and a color tone maintenance art according to claim 1 to 5.

[Claim 7] The ring current liquid tank which holds the freshner as ring current liquid, and the circulating flow way which infixes the circulating pump made to circulate through the ring current liquid in a ring current liquid tank, The smoking mixing equipment which mixes smoking with the ring current liquid infixes all over this circulating flow way, and the smoking source of supply which supplies smoking to

smoking mixing equipment, It consists of the delivery valve which pours in the ring current liquid in a ring current liquid tank into a blood vessel through the artery of the processing object which is a fish or a meat beast. Said smoking mixing equipment In casing which has the inlet port and outlet which are connected to a circulating flow way, the mixed element of the number of arbitration is held and it changes. This mixed element The concavo-convex board of two sheets which protruded the small standing wall on the opposed face which counters mutually, and formed much areole by the small standing wall is made into a lot. Make two or more areole of the concavo-convex board of another side open for free passage mutually, and the polymerization of each areole of the opposed face in those concavo-convex boards is carried out. The freshness and the color tone maintenance processor of the fresh meat characterized by what the multiplex reversal interflow way was made to form by the free passage of these areole, and it changed, and the above-mentioned mixed element was held for in this casing so that ring current liquid and smoking might circulate from the inlet port of casing to an outlet through the multiplex reversal interflow way.

[Claim 8] While carrying out the polymerization of this for the concavo-convex board of the lot in which much areole were formed, in the said alignment as a thing of two size in freshness and a color tone maintenance processor according to claim 7 and making the circumference of the concavo-convex board of a major diameter close to the inner skin of casing Drill a circulation hole in the center and the circumference of the concavo-convex board of a minor diameter is made to estrange from the inner skin of casing. The freshness and the color tone maintenance processor of the fresh meat characterized by what was made to arrange in casing which is made to form a circulation way between that inner skin, piles up the plurality of this mixed element so that the concavo-convex board of the diameter of said may adjoin mutually, and has an inlet port and an outlet in both ends.

[Claim 9] The freshness and the color tone maintenance processor of the fresh meat characterized by what the seal member was infixing between the seal bearing surfaces formed in the periphery of the plane of composition of those concavo-convex boards, and was done by this seal member for the seal between the concavo-convex boards of a major diameter, and of between them and casing inner skin when piling up in freshness and a color tone maintenance processor according to claim 8 so that the concavo-convex board of a major diameter may adjoin.

[Claim 10] In freshness and a color tone maintenance processor according to claim 7, attachment and detachment of the lid in which the inlet port and the outlet were formed to the both ends of cylinder-like casing are enabled. A piece is really fabricated with an elastic body. the collar extended to the method side of inside from the both ends of the cylinder part of the outer diameter inserted in the inner skin of that casing, and this cylinder part -- While carrying out the polymerization of this in the said alignment and making the circumference of the concavo-convex board of a major diameter close to the inner skin of the cylinder part in a fit-in seal object as a thing of two size, the circular irregularity board of the lot which formed the ring-like fit-in seal object and formed much areole in the opposed face Drill a circulation hole in the center and the circumference of the concavo-convex board of a minor diameter is made to estrange from the inner skin of the cylinder part in a fit-in seal object. Make a circulation way form between that cylinder part inner skin, and it is made for the concavo-convex board of a major diameter to be located in the both ends of superposition and the fit-in seal inside of the body so that the concavo-convex board of the diameter of said may adjoin the plurality of this mixed element mutually. By holding the plurality of the mixed element in the fit-in seal inside of the body a set element -- accomplishing -- the number of arbitration of this set element -- the inside of casing -- arranging -- a lid -- the collar of that fit-in seal object -- the freshness and the color tone maintenance processor of the fresh meat characterized by what the piece was bound tight and done for the seal of the both ends of a set element.

[Translation done.]